



2021 Security Day

探测与防护控制



云上的威胁： MITRE ATT&CK –Metrix

以下是代表面向云技术的MITRE attack & ck®矩阵的战术和技术。该矩阵包含AWS平台的信息。

Initial Access 3 techniques	Persistence 4 techniques	Privilege Escalation 1 techniques	Defense Evasion 4 techniques	Credential Access 2 techniques	Discovery 9 techniques	Collection 2 techniques	Exfiltration 1 techniques	Impact 4 techniques
Exploit Public-Facing Application	Account Manipulation (1)	Valid Accounts (2)	Impair Defenses (2)	Brute Force (3)	Account Discovery (1)	Data from Cloud Storage Object	Transfer Data to Cloud Account	Defacement (1)
Trusted Relationship	Create Account (1)		Modify Cloud Compute Infrastructure (4)	Unsecured Credentials (2)	Cloud Infrastructure Discovery	Data Staged (1)		Endpoint Denial of Service (3)
Valid Accounts (2)	Implant Container Image		Unused/Unsupported Cloud Regions		Cloud Service Dashboard			Network Denial of Service (2)
	Valid Accounts (2)		Valid Accounts (2)		Cloud Service Discovery			Resource Hijacking
					Network Service Scanning			
					Permission Groups Discovery (1)			
					Software Discovery (1)			
					System Information Discovery			
					System Network Connections Discovery			

Last modified: 27 October 2020

OWASP Top 10

OWASP Top 10是一个针对开发人员和web应用安全的标准文档。它代表了关于web应用程序最关键的安全风险的广泛共识。

注入

将不受信任的数据作为命令或查询的一部分发送到解析器时，会产生诸如SQL注入、NoSQL注入、OS注入和LDAP注入的注入缺陷。攻击者的恶意数据可以诱使解析器在没有适当授权的情况下执行非预期命令或访问数据。

失效的身份认证

通常，通过错误使用应用程序的身份认证和会话管理功能，攻击者能够破译密码、密钥或会话令牌，或者利用其它开发缺陷来暂时性或永久性冒充其他用户的身份。

敏感信息泄露

许多Web应用程序和API都无法正确保护敏感数据，例如：财务数据、医疗数据和PII数据。攻击者可以通过窃取或修改未加密的数据来实施信用卡诈骗、身份盗窃或其他犯罪行为。未加密的敏感数据容易受到破坏，因此，我们需要对敏感数据加密，这些数据包括：传输过程中的数据、存储的数据以及浏览器的交互数据。

XML 外部实体（XXE）

许多较早的或配置错误的XML处理器评估了XML文件中的外部实体引用。攻击者可以利用外部实体窃取使用URI文件处理器的内部文件和共享文件、监听内部扫描端口、执行远程代码和实施拒绝服务攻击。

失效的访问控制

未对通过身份验证的用户实施恰当的访问控制。攻击者可以利用这些缺陷访问未经授权的功能或数据，例如：访问其他用户的帐户、查看敏感文件、修改其他用户的数据、更改访问权限等。

安全配置错误

安全配置错误是最常见的安全问题，这通常是由于不安全的默认配置、不完整的临时配置、开源云存储、错误的HTTP标头配置以及包含敏感信息的详细错误信息所造成的。因此，我们不仅需要对所有的操作系统、框架、库和应用程序进行安全配置，而且必须及时修补和升级它们。

跨站脚本（XSS）

当应用程序的新网页中包含不受信任的、未经恰当验证或转义的数据时，或者使用可以创建HTML或JavaScript的浏览器API更新现有的网页时，就会出现XSS缺陷。XSS让攻击者能够在受害者的浏览器中执行脚本，并劫持用户会话、破坏网站或将用户重定向到恶意站点。

不安全的反序列化

不安全的反序列化会导致远程代码执行。即使反序列化缺陷不会导致远程代码执行，攻击者也可以利用它们来执行攻击，包括：重播攻击、注入攻击和特权升级攻击。

使用含有已知漏洞的组件

组件（例如：库、框架和其他软件模块）拥有和应用程序相同的权限。如果应用程序中含有已知漏洞的组件被攻击者利用，可能会造成严重的数据丢失或服务接管。同时，使用含有已知漏洞的组件的应用程序和API可能会破坏应用程序防御、造成各种攻击并产生严重影响。

不足的日志记录和监控

不足的日志记录和监控，以及事件响应缺失或无效的集成，使攻击者能够进一步攻击系统、保持持续性或转向更多系统，以及篡改、提取或销毁数据。大多数缺陷研究显示，缺陷被检测出的时间超过200天，且通常通过外部检测方检测，而不是通过内部流程或监控检测。



Center for Internet Security (CIS) Amazon Web Services Foundations

CIS安全基准程序提供了定义明确、公正、基于共识的行业最佳实践，以帮助组织评估和提高其安全性。亚马逊云科技是CIS安全基准测试的成员公司



CIS Amazon Web Services Foundations

v1.2.0 - 05-23-2018

Control		Set Correctly	
		Yes	No
1	Identity and Access Management		
1.1	Avoid the use of the "root" account (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.2	Ensure multi-factor authentication (MFA) is enabled for all IAM users that have a console password (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.3	Ensure credentials unused for 90 days or greater are disabled (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.4	Ensure access keys are rotated every 90 days or less (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.5	Ensure IAM password policy requires at least one uppercase letter (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.6	Ensure IAM password policy require at least one lowercase letter (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.7	Ensure IAM password policy require at least one symbol (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.8	Ensure IAM password policy require at least one number (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.9	Ensure IAM password policy requires minimum length of 14 or greater (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.10	Ensure IAM password policy prevents password reuse (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.11	Ensure IAM password policy expires passwords within 90 days or less (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.12	Ensure no root account access key exists (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.13	Ensure MFA is enabled for the "root" account (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.14	Ensure hardware MFA is enabled for the "root" account (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.15	Ensure security questions are registered in the AWS account (Not Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.16	Ensure IAM policies are attached only to groups or roles (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.17	Maintain current contact details (Not Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.18	Ensure security contact information is registered (Not Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.19	Ensure IAM instance roles are used for AWS resource access from instances (Not Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.20	Ensure a support role has been created to manage incidents with AWS Support (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
1.21	Do not setup access keys during initial user setup for all IAM users that have a console password (Not Scored)	<input type="checkbox"/>	<input type="checkbox"/>
3.14	Ensure a log metric filter and alarm exist for VPC changes (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
4	Networking		
4.1	Ensure no security groups allow ingress from 0.0.0.0/0 to port 22 (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
4.2	Ensure no security groups allow ingress from 0.0.0.0/0 to port 3389 (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
4.3	Ensure the default security group of every VPC restricts all traffic (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
4.4	Ensure routing tables for VPC peering are "least access" (Not Scored)	<input type="checkbox"/>	<input type="checkbox"/>

1.22	Ensure IAM policies that allow full "*" administrative privileges are not created (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
2	Logging		
2.1	Ensure CloudTrail is enabled in all regions (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
2.2	Ensure CloudTrail log file validation is enabled (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
2.3	Ensure the S3 bucket used to store CloudTrail logs is not publicly accessible (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
2.4	Ensure CloudTrail trails are integrated with CloudWatch Logs (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
2.5	Ensure AWS Config is enabled in all regions (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
2.6	Ensure S3 bucket access logging is enabled on the CloudTrail S3 bucket (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
2.7	Ensure CloudTrail logs are encrypted at rest using KMS CMKs (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
2.8	Ensure rotation for customer created CMKs is enabled (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
2.9	Ensure VPC flow logging is enabled in all VPCs (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
3	Monitoring		
3.1	Ensure a log metric filter and alarm exist for unauthorized API calls (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
3.2	Ensure a log metric filter and alarm exist for Management Console sign-in without MFA (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
3.3	Ensure a log metric filter and alarm exist for usage of "root" account (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
3.4	Ensure a log metric filter and alarm exist for IAM policy changes (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
3.5	Ensure a log metric filter and alarm exist for CloudTrail configuration changes (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
3.6	Ensure a log metric filter and alarm exist for AWS Management Console authentication failures (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
3.7	Ensure a log metric filter and alarm exist for disabling or scheduled deletion of customer created CMKs (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
3.8	Ensure a log metric filter and alarm exist for S3 bucket policy changes (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
3.9	Ensure a log metric filter and alarm exist for AWS Config configuration changes (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
3.10	Ensure a log metric filter and alarm exist for security group changes (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
3.11	Ensure a log metric filter and alarm exist for changes to Network Access Control Lists (NACL) (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
3.12	Ensure a log metric filter and alarm exist for changes to network gateways (Scored)	<input type="checkbox"/>	<input type="checkbox"/>
3.13	Ensure a log metric filter and alarm exist for route table changes (Scored)	<input type="checkbox"/>	<input type="checkbox"/>

为什么需要探测控制？

- 预防性控制并非万灵药
- 发现使反应
- 最小特权很难实现，也更难维护
- 坏人总是在寻找新的方法来规避控制
- 监管机构和审计机构需要证据
- 简化调试和维护性能
- 提高开发人员的生产力并鼓励创新

主要的安全需求



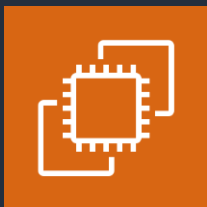
安全监控与威胁检测



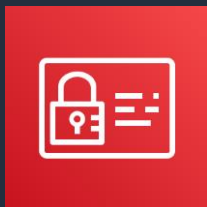
数据保护



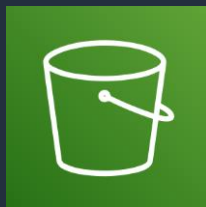
保护范围



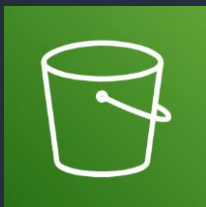
Amazon EC2



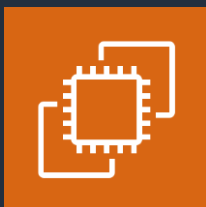
AWS Identity
and Access
Management
(IAM)



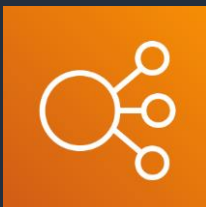
Amazon Simple
Storage Service
(S3)



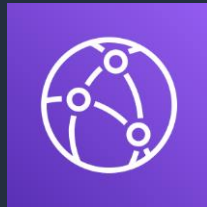
Amazon Simple
Storage Service
(S3)



Amazon EC2



Elastic Load
Balancing
(ELB)

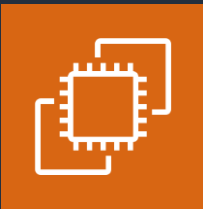


Amazon
CloudFront

安全监控与威胁检测



安全监控与威胁检测



Amazon EC2



AWS Identity and Access Management (IAM)



Amazon Simple Storage Service (S3)



Amazon GuardDuty



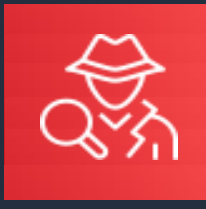
Amazon Inspector



Amazon Macie



AWS Security Hub



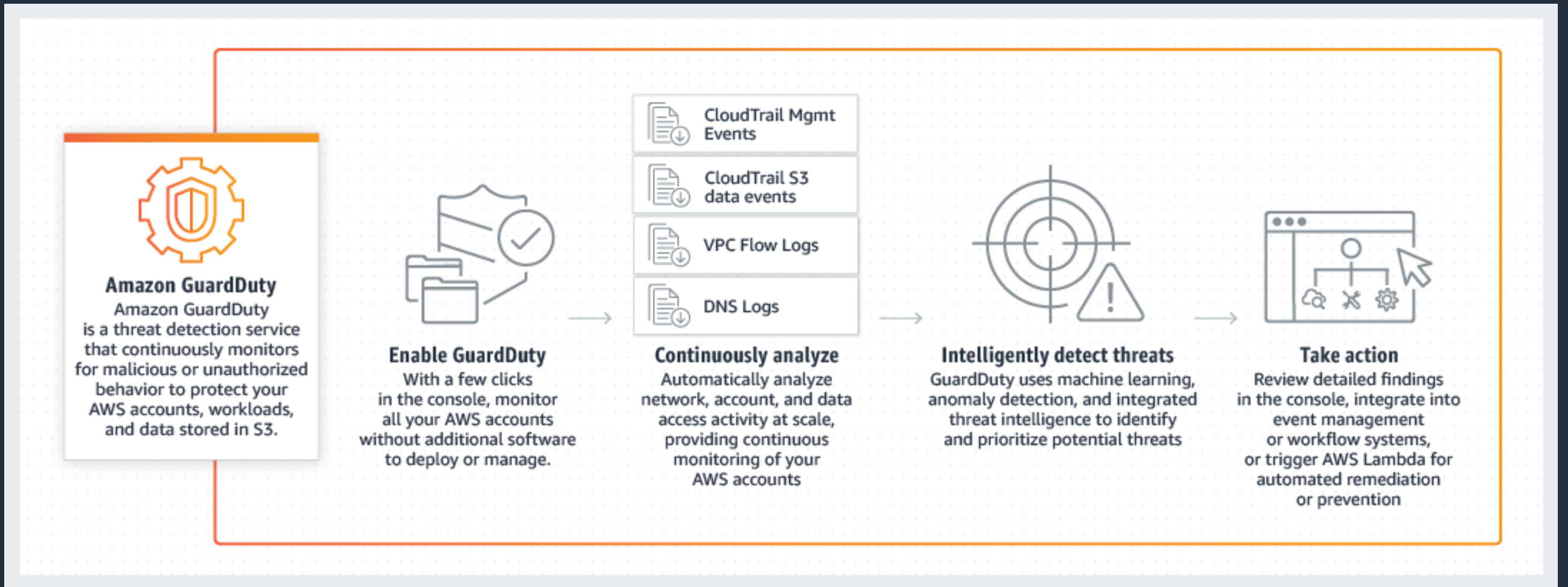
Amazon Detective

“采取行动”

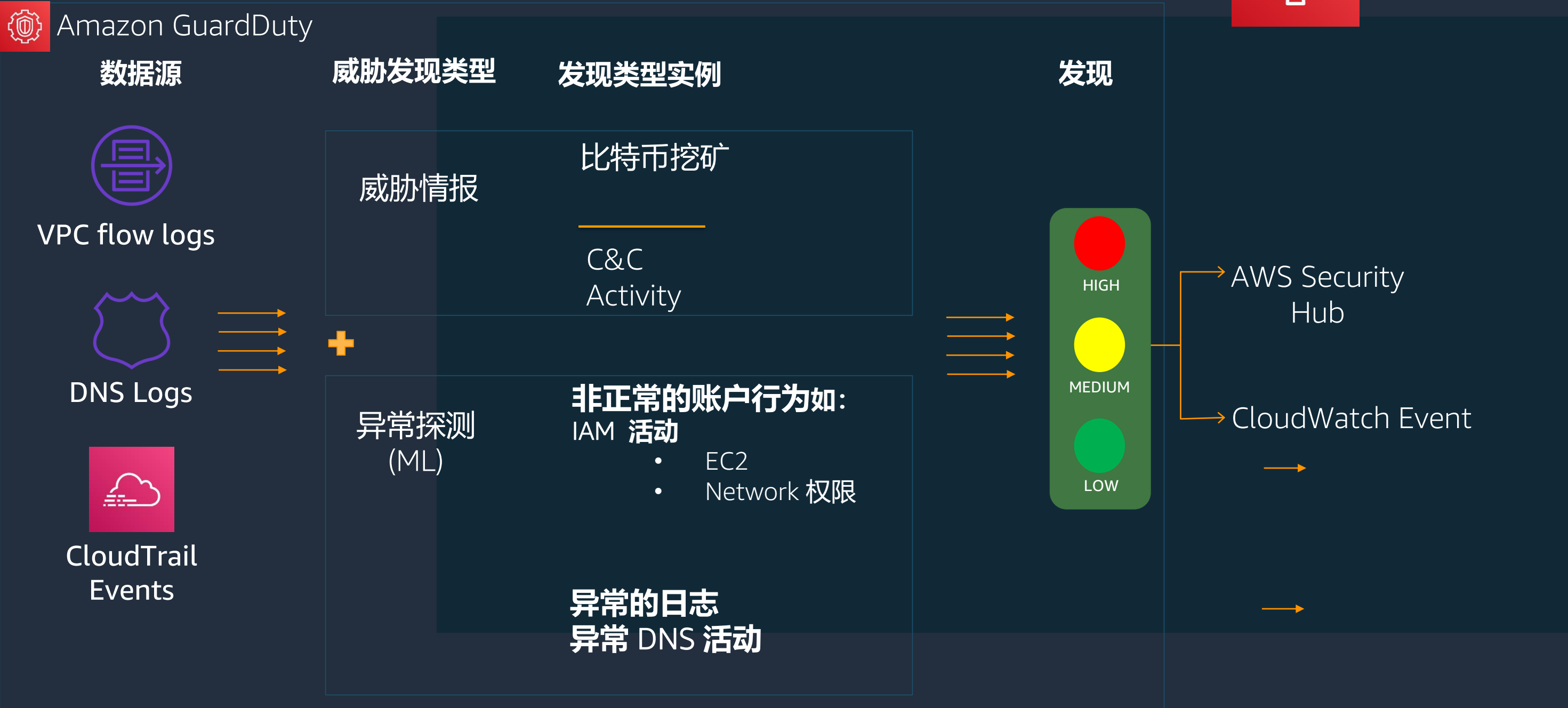
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托管的威胁检测服务 GuardDuty?

通过智能威胁检测和持续监控保护您的AWS帐户和工作负载



威胁检测服务GuardDuty怎么工作?



威胁检测服务 GuardDuty 可以发现什么？

超过50种，并在不断增长中...

Backdoor Finding
Types

Behavior Finding
Types

Crypto Currency
Finding Types

PenTest Finding Types

Persistence Finding
Types

Policy Finding Types

Privilege Escalation
Finding Types

Recon Finding Types

Resource
Consumption Finding
Types

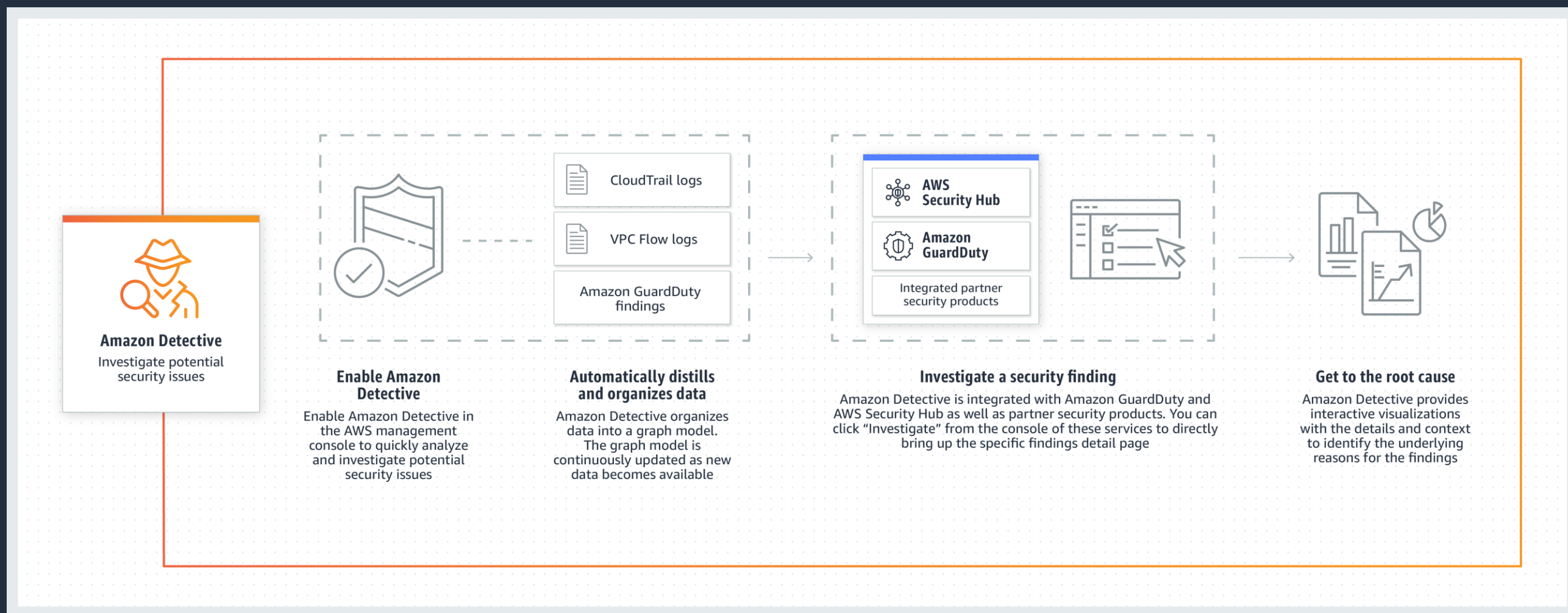
Stealth Finding Types

Trojan Finding Types

Unauthorized Finding
Types

什么是Detective

Amazon Detective自动从您的AWS资源收集日志数据，并使用机器学习、统计分析和图理论来构建一组链接数据，使您能够轻松地进行更快、更有效的安全调查。借助该服务，安全团队能够轻松地调查并快速找到发现的安全问题或可疑活动根本原因。Amazon Detective可以分析来自多个数据源的数万亿事件，如VPC流日志、AWS CloudTrail、Amazon GuardDuty等，并自动创建一个统一的、交互式的资源、用户以及他们之间的交互视图。有了这个统一的视图，您可以在一个地方可视化所有的细节和上下文，以确定发现结果的潜在原因，深入到相关的历史活动中，并快速确定根本原因。



Amazon Detective使用场景

分类安全检测结果

多少数据发送出去？
网络流量正常吗？
刚才发生了什么？
这些失败调用正常吗？

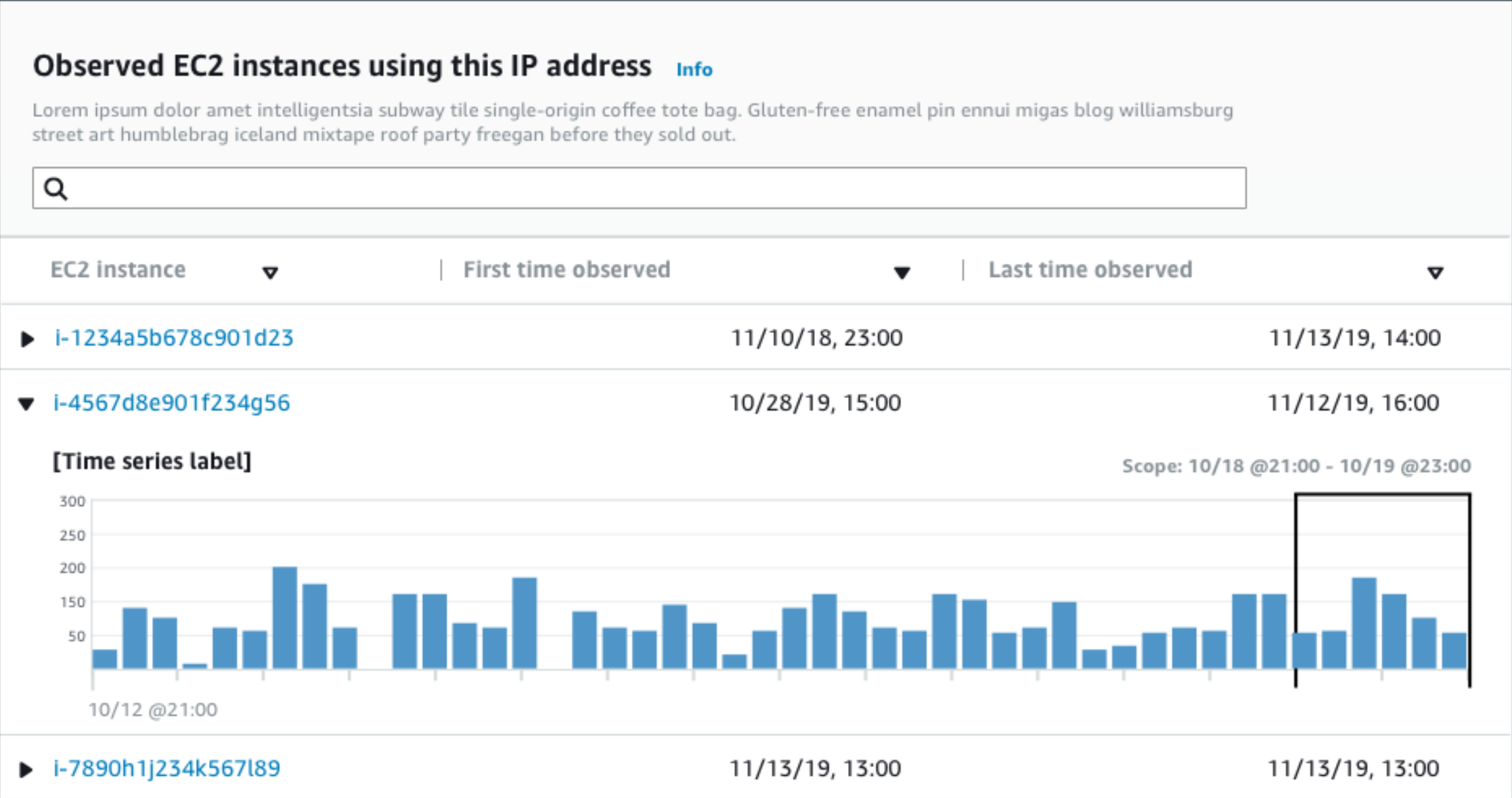
事故调查

从这个ip发出了什么API调用？
这些访问是否表明有探测？
还有其他的主题ID被使用了？
还有其他EC2和这个ip通信吗？

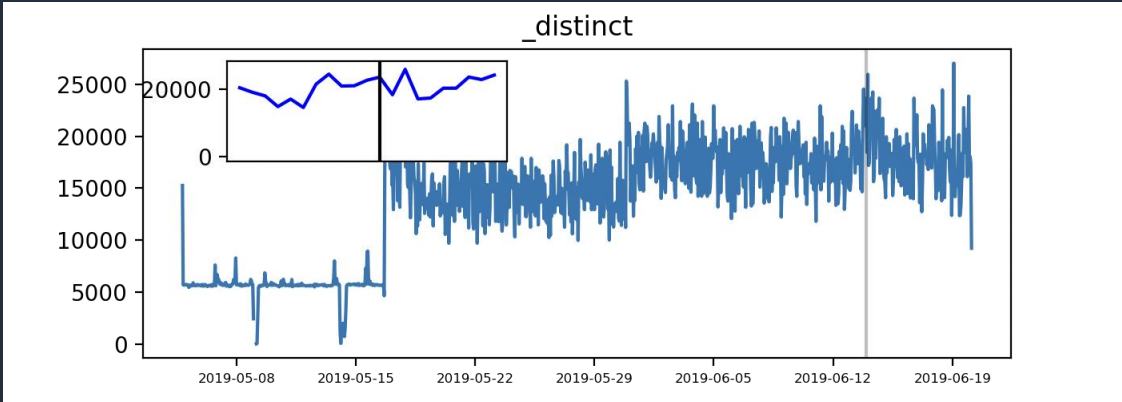
威胁搜寻

威胁报告里的ip地址在去年和那些ec2实例通信了？
这个可疑的用户的代理访问了哪些API调用？

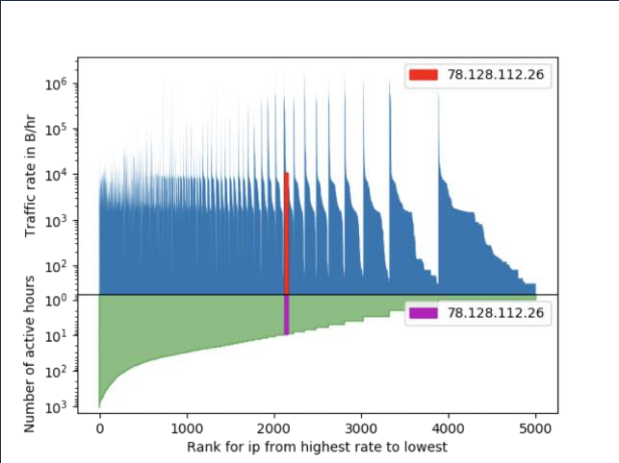
现在的状态



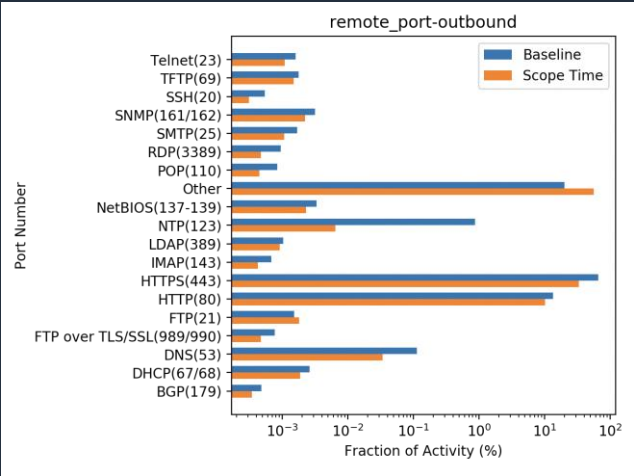
由数据科学家支持的分析结果



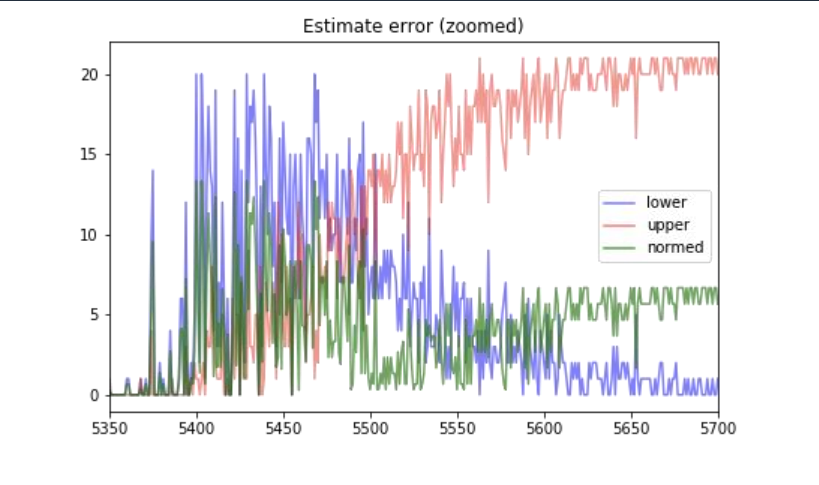
Behavioral baselines



Distributions



Time series analysis

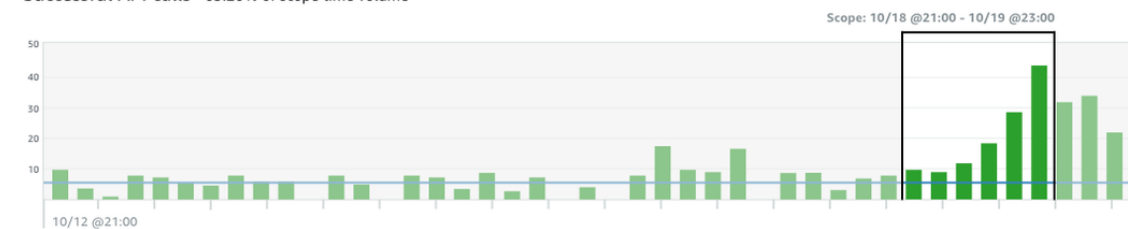


Data stream analytics

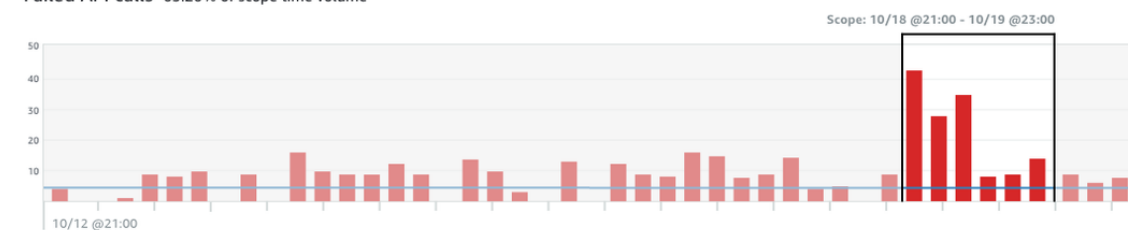
Overall API call volume [Info](#)

Displays the overall API call volume issued by this resource around the scope time, as it compares with the 45 day active baseline average.

Successful API calls 63.26% of scope time volume



Failed API calls 63.26% of scope time volume



发送了多少数据?

这个流量正常吗?

刚才发生了什么?

这些失败调用正常吗

Average VPC flow volume for common ports [Info](#)

Displays the average VPC volume for a selected set of common ports. Volume that exceeds the baseline average is highlighted. Select a specific port to see a time series of its traffic.

Inbound

Outbound

Linear scale Log scale

SSH (22)

DNS (53)

HTTPS (443)

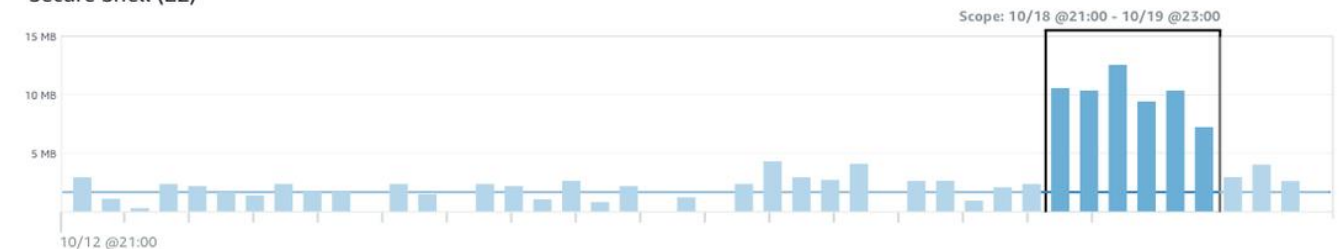
0 B

SSH (22)

Scope time average: 10.4 MB/hour (+7.82 MB/hour)
Baseline: 2.6 MB/hour

15 MB

Secure Shell (22)



Inspector 对什么进行探测，进行什么评估？

网络可达性评估： Amazon Inspector 是一项自动安全评估服务，自动评估应用程序的风险、漏洞或者相较于最佳实践的偏差。执行评估后， Amazon Inspector 会生成按严重程度确定优先级的安全检测详细列表。这些评估结果可直接接受审核，也可作为通过 Amazon Inspector 控制台或 API 提供的详细评估报告的一部分接受审核。

Inspector 默认是无代理模式， 客户可以选择安装代理， 实现更细致的评估。

- 安全组
- vpc
- 网络接口
- 子网
- 网络ACL
- 路由表
- 弹性负载均衡器
- 应用程序负载均衡器
- 互联网网关
- 虚拟专用网关
- DX
- VPC对等连接

常见漏洞 (CVE)

Internet 安全中心 (CIS)
基准

安全最佳实践

运行时行为分析

Inspector 无代理模式下的发现示例

Finding	On instance <code>i-0df739d0c3b0e1410</code> , TCP port 22 which is associated with 'SSH' is reachable from the internet
Severity	Medium ⓘ
Description	On this instance, TCP port 22, which is associated with SSH, is reachable from the internet. You can install the Inspector agent on this instance and re-run the assessment to check for any process listening on this port. The instance <code>i-0df739d0c3b0e1410</code> is located in VPC <code>vpc-e6a88f9d</code> and has an attached ENI <code>eni-b59b2c2d</code> which uses network ACL <code>acl-56d85d2c</code> . The port is reachable from the internet through Security Group <code>sg-3fa76677</code> and IGW <code>igw-f83d5680</code>
Recommendation	Edit the Security Group <code>sg-3fa76677</code> to remove access from the internet on port 22

Port

Where?

How?

Inspector 有代理模式下的发现示例（可选）

Finding On instance `i-0de84bab1a28533b9`, process 'sshd' is listening on tcp port 22 which is associated with 'SSH' and is reachable from the internet

Severity Medium ⓘ

Which process

Port

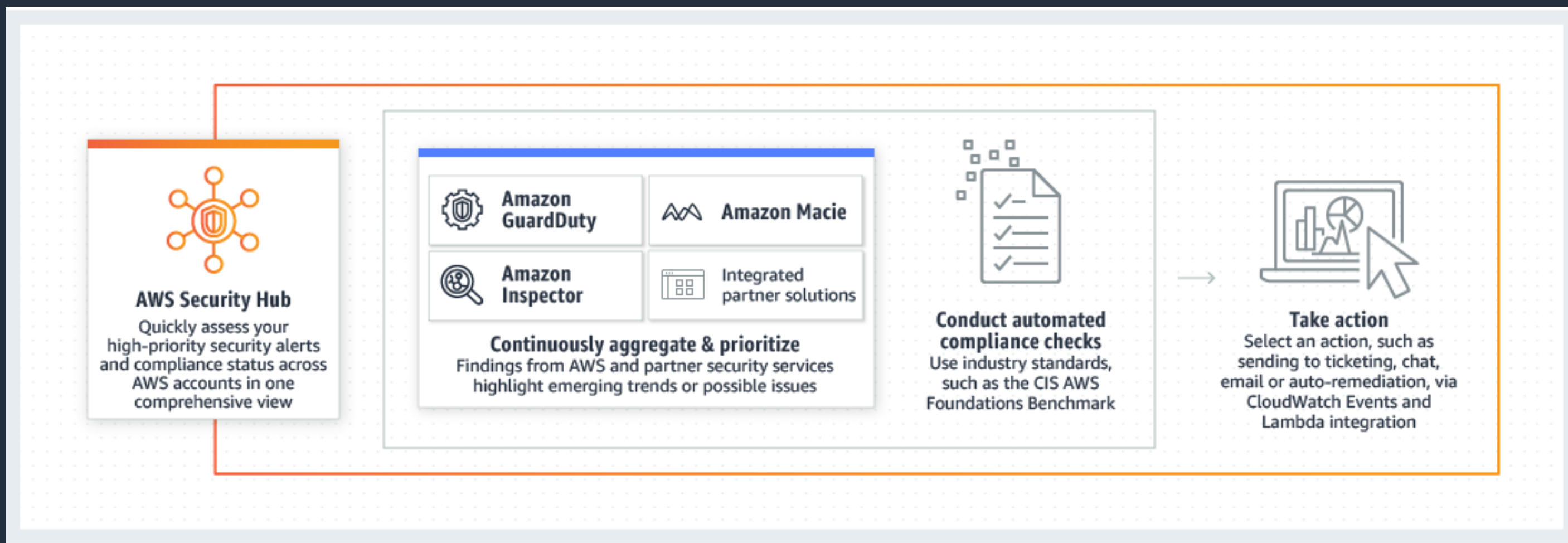
Description On this instance, tcp port 22, which is typically used for SSH, is reachable from the internet with a process listening on the port. The process has name 'sshd', process id 3251, and uses binary `/usr/sbin/sshd`. The instance `i-0de84bab1a28533b9` is located in VPC `vpc-0d4af19b49294d6d0` and has an attached ENI `eni-02d01f94f58659bc1` that is in subnet `%SUBNET%` with ACL `acl-02a60f20a725bb3b4`. The port is reachable from the internet through Security Group `sg-0c93c8298671d6b0e` and IGW `igw-0205d47b1b2b6ba93`

How

Recommendation Edit the Security Group `sg-0c93c8298671d6b0e` to remove access from the internet on port 22







什么是 Security Hub

AWS Security Hub 可全面查看 AWS 账户中的高优先级安全警报与**合规性状态**。**汇聚**来自多个 AWS 服务（如 Amazon GuardDuty、Amazon Inspector 和 Amazon Macie），以及来自 AWS 合作伙伴解决方案的安全警报或检测结果，设置优先级。图表展示。还可以使用**自动合规性检查**（基于您的组织遵守的 AWS 最佳实践和行业标准），持续监控您的环境。






Security Hub集成



Firewalls






Vulnerability





Endpoint






Compliance





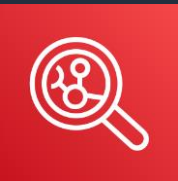

MSSP



Other



AWS Security Services Forwarding findings into AWS Security Hub

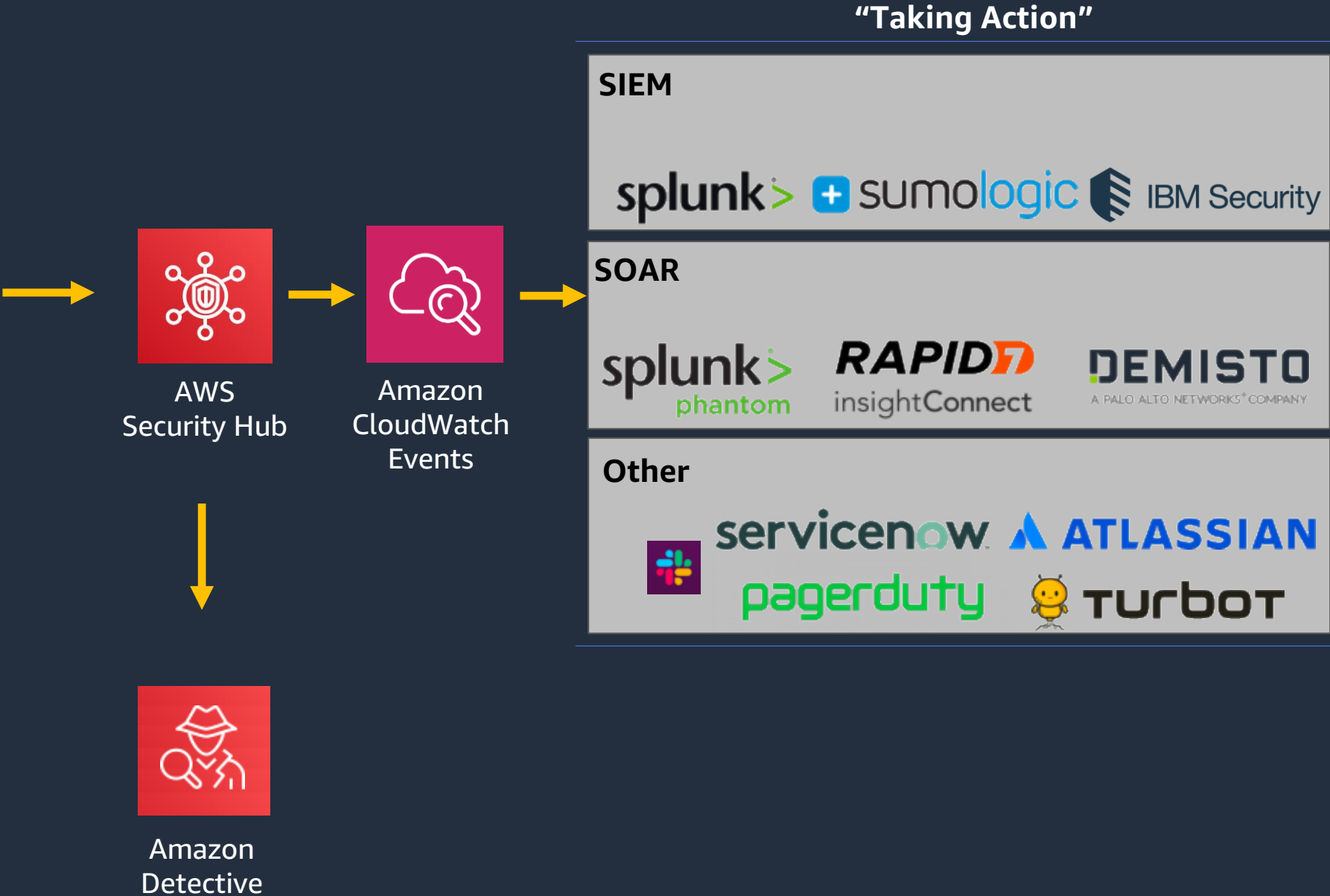


Amazon Macie

Amazon Inspector

Amazon GuardDuty

AWS Firewall Manager



Security Hub的使用场景

集中的安全和合规工作空间

- 从数据源中获取发现
- 大量且知名的发现以编程方式路由到缓解工作流，其中包括更新发现的状态
- 剩下的调查结果通过一个随叫随到的管理系统传递给分析人员，他们使用工单或聊天系统来解决这些问题

通向企业SIEM的集中路由

- 从数据源中获取发现
- 所有调查结果都将通过Amazon CloudWatch事件路由到存储AWS和内部安全与合规数据的中央SIEM
- 分析人员工作流程与中央SIEM相关联

账号负责人的仪表盘

- 从数据源中获取发现
- 帐户所有者被赋予对安全中心的只读访问权
- 帐户所有者可以使用Security Hub来研究他们所关注的问题，或主动监视自己的安全性和遵从性状态

CIS AWS Foundations rules

AWS Security Hub conducts 43 automated checks against the CIS AWS Foundations Benchmark rules.

Filter rules

< 1 2 3 >

1.1 Avoid the use of the "root" account

⊗ Non-compliant

1 account failed

1.2 Ensure multi-factor authentication (MFA) is enabled for all IAM users that have a console password

✔ Compliant

1 account passed

1.3 Ensure credentials unused for 90 days or greater are disabled

✔ Compliant

1 account passed

1.4 Ensure access keys are rotated every 90 days or less

✔ Compliant

1 account passed

1.5 Ensure IAM password policy requires at least one uppercase letter

✔ Compliant

1 account passed

1.6 Ensure IAM password policy requires at least one lowercase letter

✔ Compliant

1 account passed

1.7 Ensure IAM password policy requires at least one symbol

✔ Compliant

1 account passed

1.8 Ensure IAM password policy requires at least one number

✔ Compliant

1 account passed

1.9 Ensure IAM password policy requires minimum password length of 14 or greater

✔ Compliant

1 account passed

1.10 Ensure IAM password policy prevents password reuse

⊗ Non-compliant

1 account failed

1.11 Ensure IAM password policy expires passwords within 90 days or less

✔ Compliant

1 account passed

1.12 Ensure no root account access key exists

✔ Compliant

1 account passed

1.13 Ensure MFA is enabled for the "root" account

⊗ Non-compliant

1 account failed

1.14 Ensure hardware MFA is enabled for the "root" account

⊗ Non-compliant

1 account failed

1.16 Ensure IAM policies are attached only to groups or roles

✔ Compliant

1 account passed

1.22 Ensure IAM policies that allow full "*" administrative privileges are not created

✔ Compliant

1 account passed

2.1 Ensure CloudTrail is enabled in all regions

✔ Compliant

1 account passed

2.2 Ensure CloudTrail log file validation is enabled

✔ Compliant

1 CloudTrail trail passed

1.1 Avoid the use of the "root" account

This page displays the active findings for a standards rule.

Actions ▾

Product ARN CONTAINS :product/aws/securityhub Record state EQUALS ACTIVE Generator ID EQUALS arn:aws:securityhub::ruleset/cis-aws-... (+1) X

< 1 >

<input type="checkbox"/>	Severity ▾	Company	Product	Title ▾	Resource ID	Resource type	Status ▲	Updated at ▾
<input type="checkbox"/>	● LOW	AWS	Security Hub	1.1 Avoid the use of the "root" account	AWS:::Account:068873283051	AwsAccount	FAILED	12 hours ago

1.1 Avoid the use of the "root" account X

Finding ID: arn:aws:securityhub:eu-west-3:068873283051:subscription/cis-aws-foundations-benchmark/v/1.2.0/1.1/finding/5481801a-8742-4337-8353-d12bede379fa

The "root" account has unrestricted access to all resources in the AWS account. It is highly recommended that the use of this account be avoided.

Archive finding

AWS account ID 068873283051	Severity (Original) 2
Severity (Normalized) 20	Compliance status FAILED
Created at 2019-05-13T16:03:15.915Z	Updated at 2019-05-15T04:19:15.893Z
Product name Security Hub	Severity label LOW
Company name AWS	

Types and Related Findings

Types

Software and Configuration Checks/Industry and Regulatory Standards/CIS AWS Foundations Benchmark ▾

Resources

Resources detail

AwsAccount ▾	
Resource type AwsAccount	Resource region eu-west-3
Resource ID AWS:::Account:068873283051	

Remediation

For directions on how to fix this issue, please consult the AWS Security Hub CIS documentation.

安全服务和用户场景总结

